

Homeowners' Guide for Flood, Debris, and Erosion Control After Fires



County of San Diego

The County of San Diego gratefully acknowledges the assistance of the following agencies and publications in preparing this guide:

Homeowner's Guide for Flood, Debris, and Erosion Control published by the Los Angeles County Department of Public Works

Homeowners Guide for Flood Prevention and Response published by Santa Barbara County Flood Control and Water Conservation District

Stormwater Best Management Practice Handbook for Construction Activities California Stormwater Quality Association (CASQA), January 2003

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In response to the October 2003 fires the County is providing materials to assist homeowners in controlling erosion on their property. These materials, and information regarding their use is available at the following County facilities:

Valley Center/Palomar Road Station
28565 Cole Grade Road
Valley Center 92082

Ramona Road Station MS N191
116 5th Street
Ramona 92065

Julian Road Station
1524 N. Highway 78
Julian

Lakeside Road Station
13115 Willow Road
Lakeside 92040

Alpine/Descanso Road Station
2914 Tavern Road
Alpine 91901

For more information contact the County Stormwater Hotline at 1-888-846-0800

After the Fire

The effects of fire can be felt long after the flames are extinguished. Rates of erosion and runoff can increase to dangerous levels when trees, shrubs, grasses and other groundcover are no longer present to lessen the erosive potential of rainstorms. Under normal circumstances, roots help to stabilize soil, while stems and leaves slow water down, giving it time to percolate into the soil. These protective functions can be severely compromised or even eliminated by fires. In the aftermath, the potential for flooding, debris flows, and erosion is greatly increased. Fortunately there are many things you can do to protect your home or business from the damaging effects of the following hazards:

Flooding. Flooding may occur even during moderate storms as rain falls on areas where vegetation has been destroyed by fire. Remember that flood waters:

- Consist of large quantities of water, and are often very turbulent and murky due to fine sediment, ash, and soil
- Occur in moderate to large storms and can quickly reach depths that would pose a threat to people or automobiles
- Inundate large areas and can damage or destroy structures in their path

Debris Flows. Debris flows are equally dangerous, especially in hillside or mountainous areas. Remember that debris flows:

- Consist of large quantities of soil, rocks, boulders, trees, or brush moved by flood waters
- Occur when flood waters flow over hillsides and natural streambeds and are most serious in areas denuded by recent fire or grading
- Are highly destructive and leave large quantities of sediment and rocks in their paths
- Contain sufficient strength to destroy objects in their path
- Can be controlled or directed to reduce property damage

Erosion. Erosion often results in steep banks of scoured soil or other ground material. Remember that erosion:

- Cannot be controlled while it is happening and is often not seen until flood waters have subsided.
- Can seriously undermine structures, leading to major failures.
- Occurs most often when waters flow rapidly over loosely compacted soil or denuded slopes
- Can be reduced by stabilizing slopes prior to storms

Figure 1 provides a general illustration of the types of actions you can take to protect your property from these hazards. The remainder of this guide provides more detailed descriptions of these and other recommended practices.

An Unprotected Home



A Protected Home

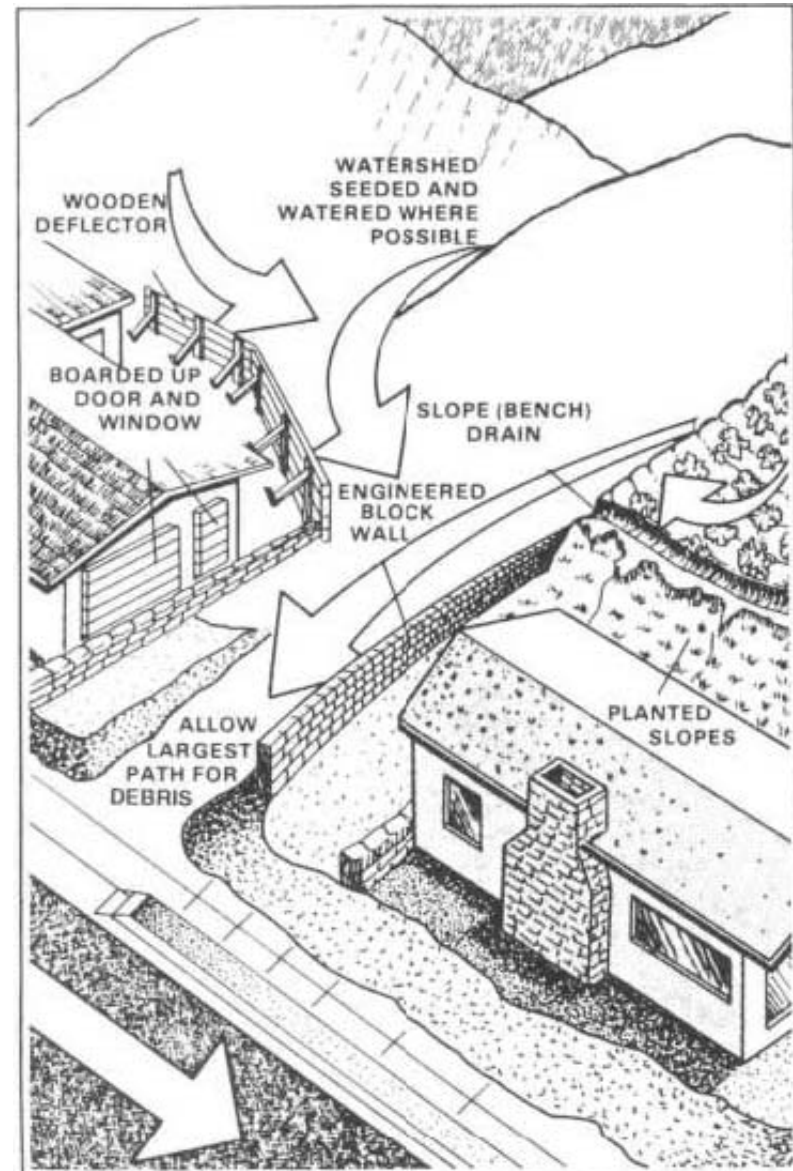


Figure 1: Examples of Unprotected and Protected Homes

Getting Prepared

Evaluating your Property

Thoroughly evaluating and planning for storm events is a critical first step in protecting your property. Start by determining where water and debris are likely to flow and collect. Once you have located overland escape routes for water and debris, plan diversions accordingly. Pay particular attention to low spots and high flow areas when planning for structure and property protection.

General Precautions

During a storm event, property damage can be attributed to stormwater runoff, debris (mud, rocks, branches, etc.), or both. When devising a protection strategy for your property, pay special attention to the following general rules:

- Never underestimate the power of stormwater and debris flows
- Try to direct stormwater and debris flows away from improvements
- Avoid altering drainage patterns in a way that might worsen conditions for your neighbor. Work cooperatively to achieve the best results.
- Avoid trying to control or confine flows more than is absolutely necessary
- Always place protection to deflect debris, not to dam or stop it
- Board up windows if necessary to prevent debris from entering buildings
- Protect your most valuable property first - your home; then consider what time and money are available to protect other less valuable objects such as swimming pools or landscaping
- Be prepared to sacrifice the use of portions of your property to achieve the greatest amount of protection
- Don't take unnecessary risks; if your debris control problems appear to warrant solutions beyond the scope of this guide, consult a competent expert such as a civil or geotechnical engineer or a landscape architect for additional advice

Materials and Supplies

There are many effective and relatively inexpensive do-it-yourself ways to control flows. Most can be installed with normal household tools using materials available at your local lumber yard or hardware store. Materials that you may need in implementing the specific methods described in this guide typically include sandbags, gravel bags, erosion matting, fiber rolls, lumber, plywood, plastic sheeting, rubber seals (similar to weather stripping), and concrete blocks.

Sandbags are commonly used for a variety of specific purposes in preventing property damage. Properly filled sandbags can be used very effectively to redirect stormwater and debris flows away from property improvements. Figure 2 below provides general instructions for filling and placing sandbags.

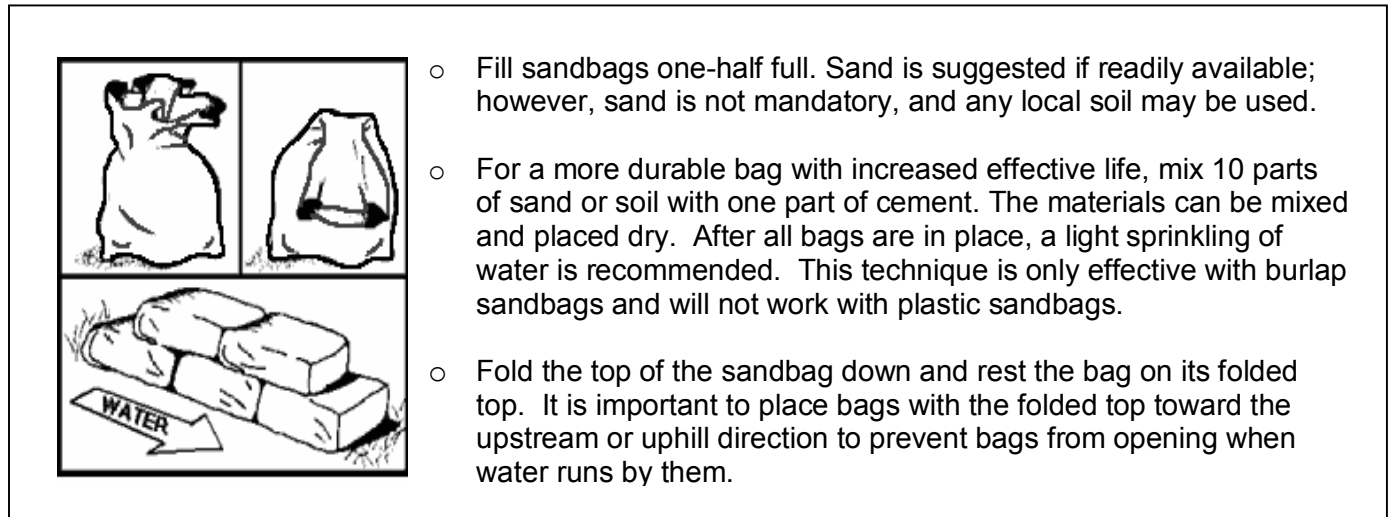


Figure 2: Instructions for Filling and Using Sandbags

To ensure their effectiveness, care should be taken to properly stack sandbags. Figure 3 below illustrates a number of ways in which sandbags can be used, each showing their proper placement. When stacking sandbags, make sure that each layer is completed prior to starting the next one. Also limit placement to two layers unless a building is used as a backing or the sandbags are pyramided.

It's important to remember that sandbags have limitations. They will not seal out water. Sand and soil filled burlap sandbags also deteriorate when they're exposed to continued wetting and drying for several months; if the bags are placed too early, they may not be effective when needed. Finally, sandbags are generally intended for low-flow protection (up to two feet). Protection from higher flows often requires a more permanent type of structure.

Gravel bags are similar to sandbags except they are made of burlap and filled with small rocks (gravel). Gravel bags should be placed on slopes to minimize erosion. The burlap and gravel allow stormwater to pass through the bag while trapping sediment upstream. Gravel bags should be placed across the slope not more than two high as shown in Figure 2. Remember to clean out the silt trapped behind the bags after each storm.

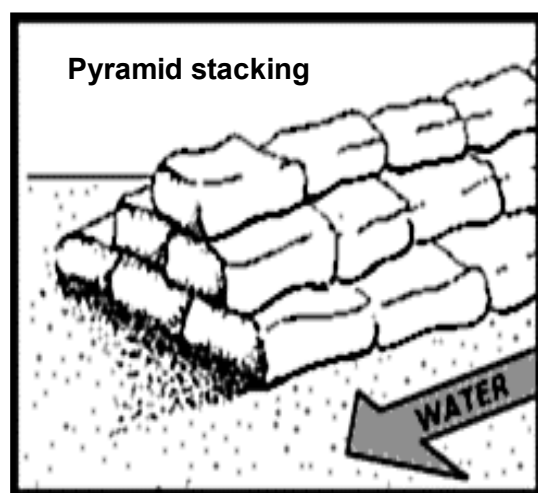
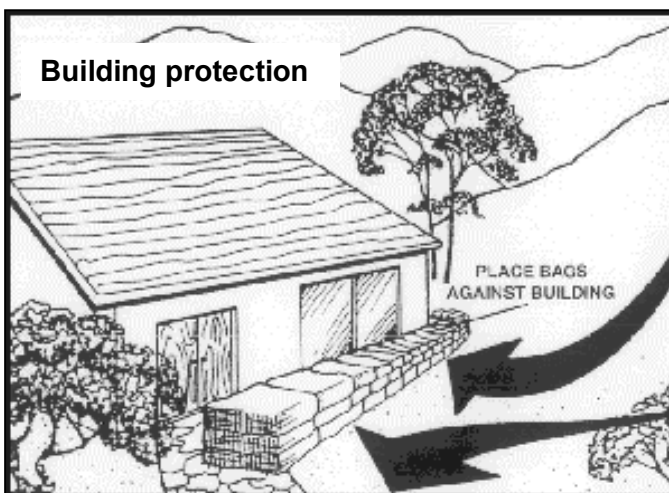
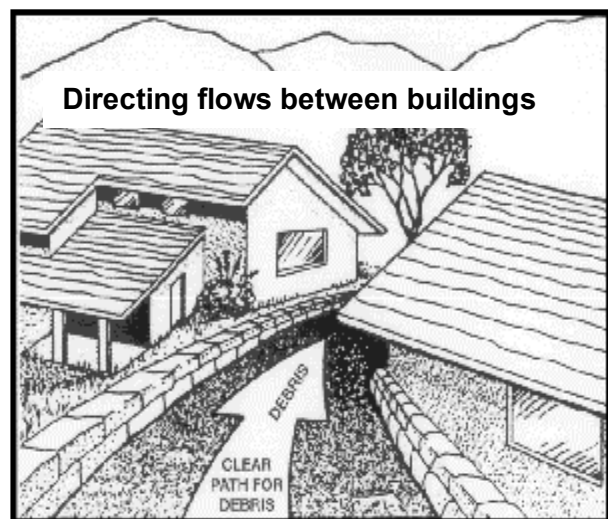
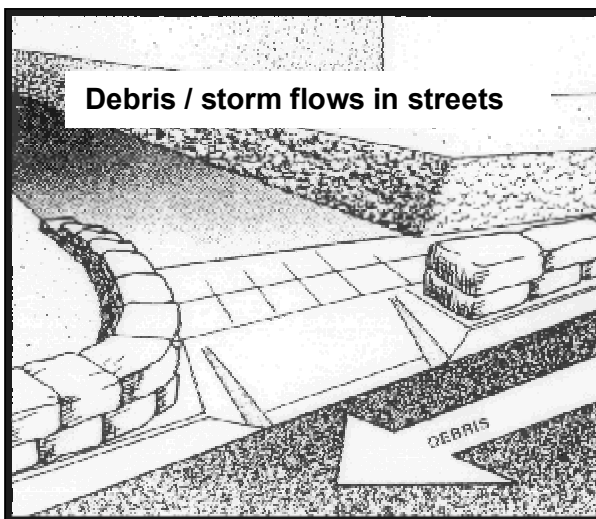
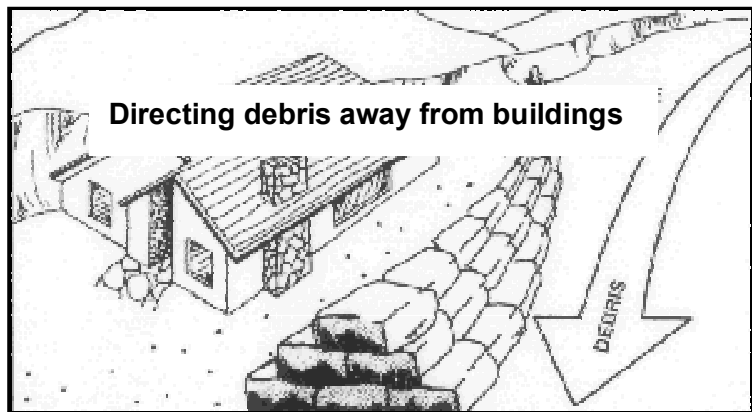
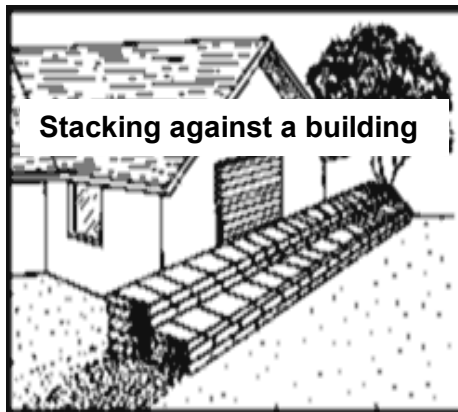


Figure 3: Uses and Proper Placement of Sandbags

Methods for Protecting Your Property

Each property is unique. Protective measures should always be selected to address your property and its surroundings. The following issues should be considered in developing a strategy:

- Protecting Structures
- Protecting Your Property from Damaging Flows
- Protecting Slopes and Surfaces from Erosion

Protecting Structures

Several types of deflection devices can be used to protect structures, doorways, and windows on your property.

For Doors and Windows: One way to protect doors and windows is to completely cover them with plywood. Low-grade plywood can be placed to overlap windows, vents, and doors 3 to 4 inches on all sides. Each sheet of plywood should be secured with four or more nails, screws, or bolts; stakes and boards may also be used to wedge barriers in place. When the plywood is no longer needed, it can be dismantled and stored for years to come. As an alternative, standing pipes on both sides of a door may be used to secure a removable barrier (see Figure 4).

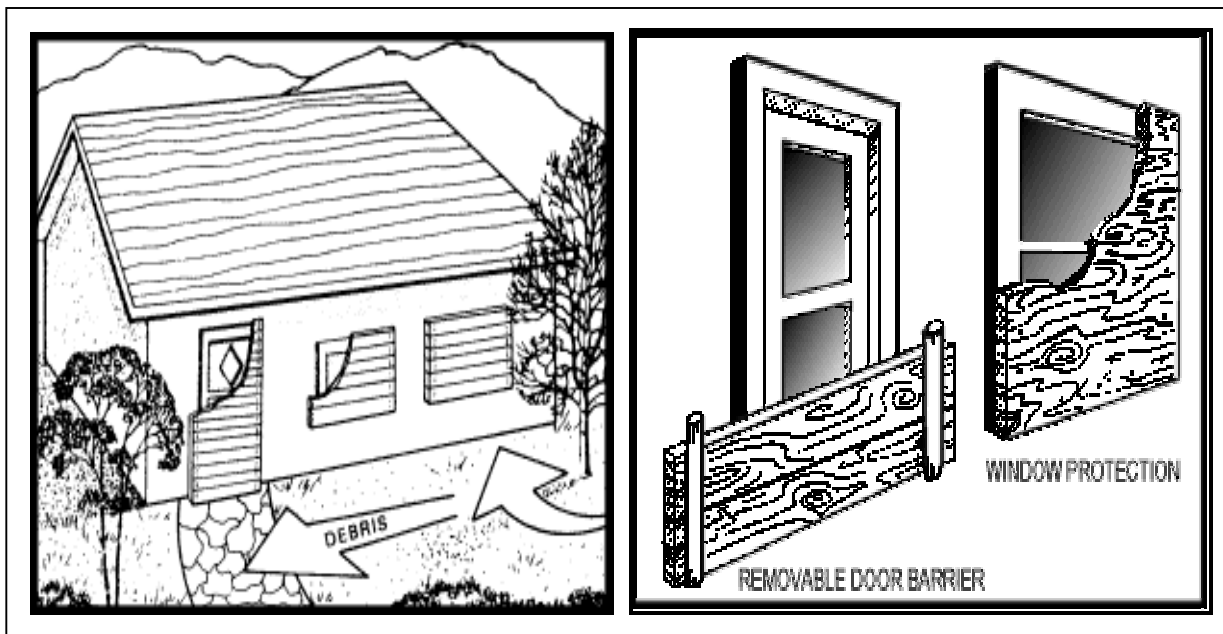


Figure 4 - Using Plywood to Protect Doors and Windows

To prevent water from seeping around a door, a rubber seal (similar to weather stripping) can be affixed to the doorframe. When the door is closed, a watertight seal should result. To prevent water from seeping around a sliding glass door, a plastic sheet (2 to 3 mils thick) should be placed between the door and the sandbags or between the door and the plywood barrier (see Figure 5). This is not recommended for water levels above two feet.

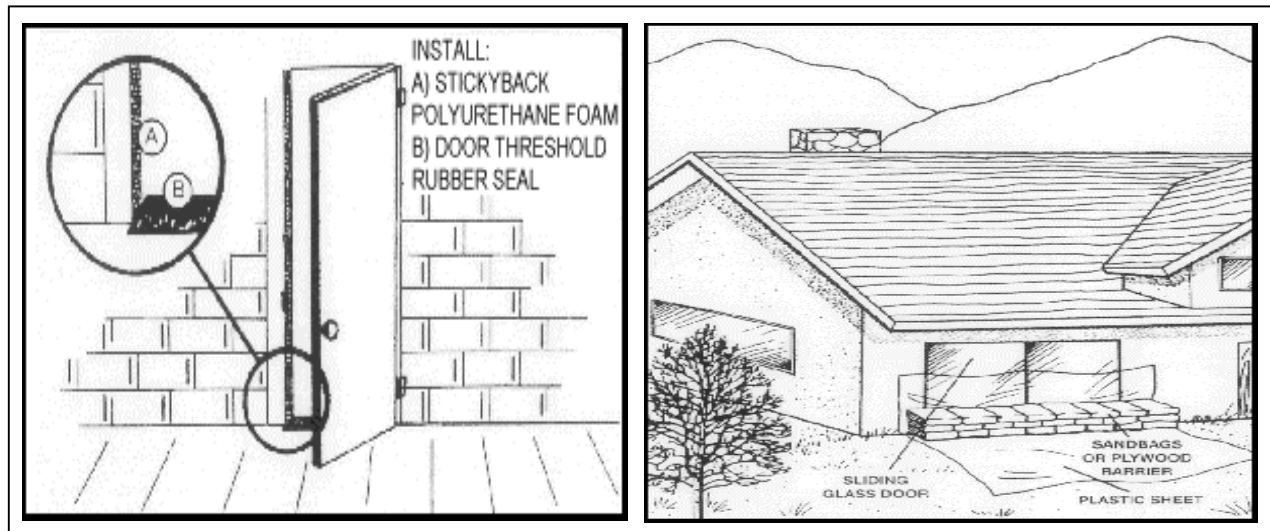


Figure 5 – Sealing Conventional and Sliding Glass Doors

For Structures: Low-grade lumber can be used to create a timber deflector (see Figure 6). This device should be limited to a height of three feet. When installing timber deflectors, drive stakes into the ground at least one-half their length to insure proper anchorage. Place deflectors on solid, level soil if possible to reduce the hazard of undercutting.

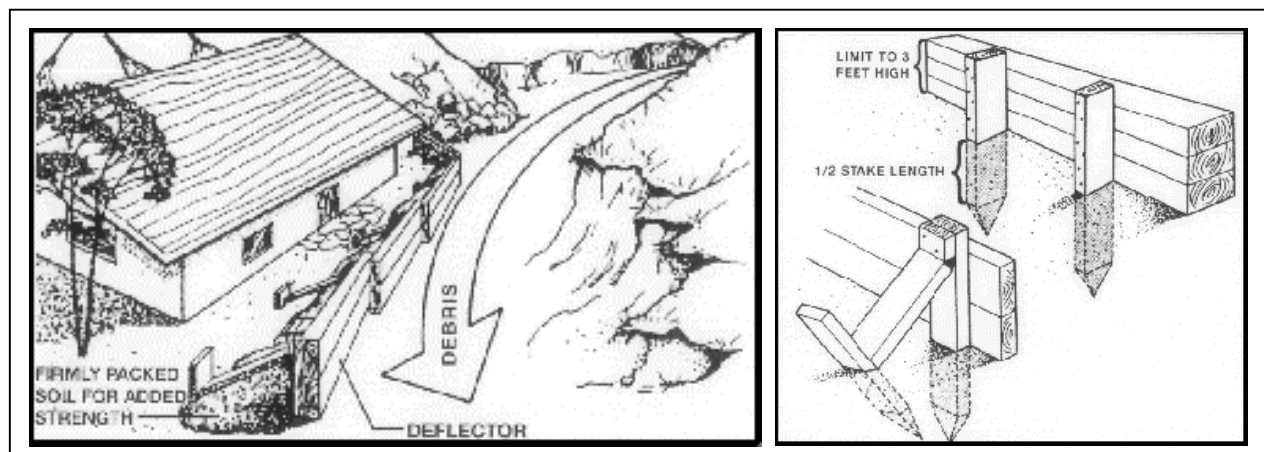


Figure 6 – Using Lumber and Soil to Create a Timber Deflector

Sections should be overlapped so that the protruding ends are facing downstream. If additional strength is needed, soil or sandbags can be firmly packed behind the deflector. If a taller barrier is required, an engineered wall should be considered.

Concrete block walls that are designed and built to withstand loads caused by water and debris are excellent for protection and durability. In many cases, such walls can be adapted to become part of the landscaping. These walls generally are expensive and should be considered permanent installations. *Caution: Do Not Rely On Non-Engineered Walls For Protection.* Other permanent solutions include telephone poles or railroad tie barriers (see Figure 7).

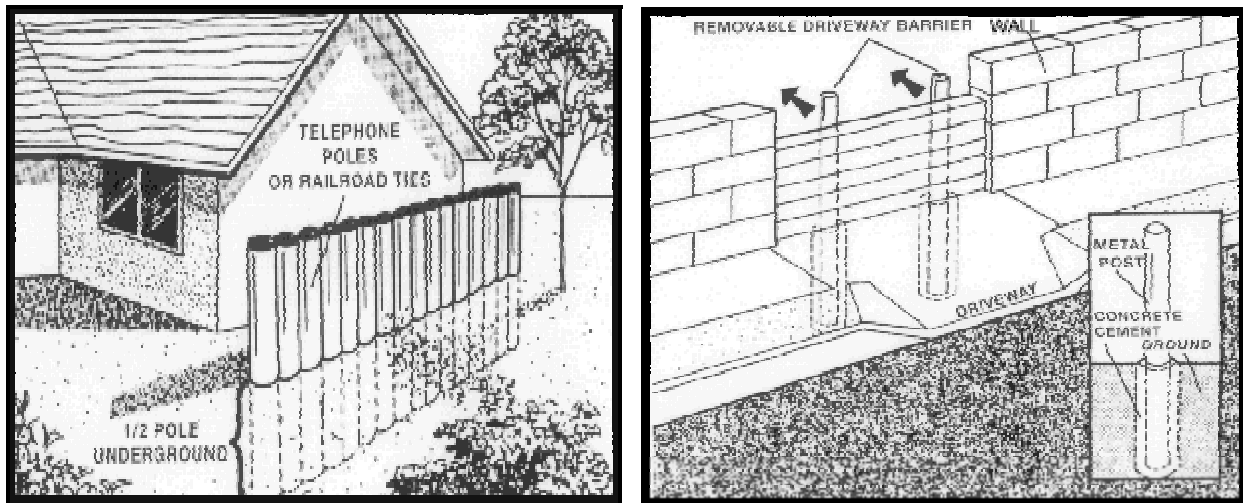


Figure 7 – Examples of Permanent Barriers

Protecting Your Property from Damaging Flows

At times it may be necessary to control the amount of water and debris that flows onto your property from surrounding areas. To divert this water, a small slope or bench drain can be dug at the top of each steep slope surrounding your property (see Figure 8). It is important not to allow large amounts of water to concentrate along one route.

Maintenance is also crucial to avoid potential flooding problems. Drains should be kept clear of debris and overgrowth since blockage may cause undermining and structural failure of the drains or erosion of the hillside. With few exceptions, maintenance of hillside drains is the responsibility of the homeowner.

Where ditches are used in unstable soil, they should be planted with perennial grasses. Slopes particularly susceptible to erosion may also require supplemental erosion control measures.

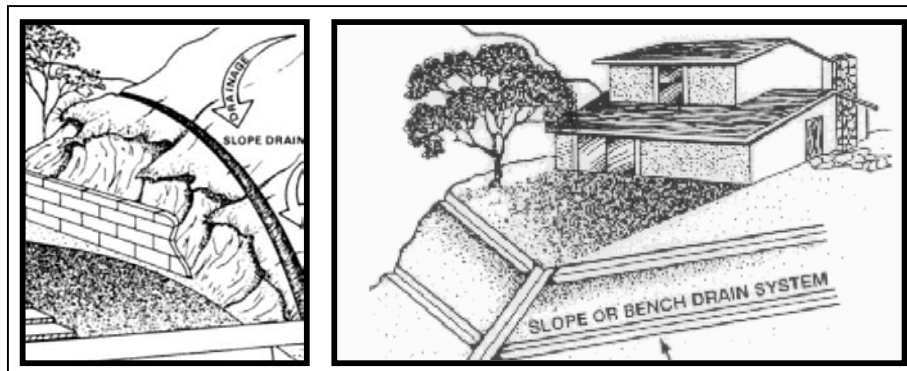


Figure 8 – Using Drains to Divert Flow from Slopes

Please note that it is unlawful to divert natural flows in a way that will negatively impact neighboring property. Always work cooperatively with your neighbors for the best results. Ditches should ideally drain into a natural watercourse, a street, or a well-vegetated area.

Protecting Slopes and Surfaces from Erosion

The focus of your erosion control strategy should be on permanently stabilizing all slopes and exposed surfaces. Proper planting of slopes is usually the easiest way to prevent erosion. Barren areas should be replanted as soon as possible, and temporary measures used until the plants are well established. Professionally applied slope stabilization is commercially available, and should be considered on high, steep slopes. These and other temporary measures are discussed below and illustrated in Figure 9.

Hydraulic Mulching. Hydraulic mulching consists of applying a mixture of shredded wood fiber or a hydraulic matrix. Mulching temporarily protects exposed soil from erosion by raindrop impact or wind. It should be applied 24 hours before a rain event. Because mulching is short-lived, a second application may be required for it to remain effective for an entire season.

Fiber Rolls. Fiber rolls consist of straw, flax, or other similar materials bound into a tight tubular roll. When they are placed at the toe and on the face of slopes, these devices intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff. When used on the slope itself, fiber rolls can also be effective in reducing erosion. They are not effective unless trenched.

Silt Fences. Silt fences are made of a filter fabric that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. They detain sediment-laden water, promoting sedimentation behind the fence. Silt fences are suitable for perimeter control and should be placed below areas where sheet flows discharge from the site. They are only applicable for sheet or overland flows, and should not be used on slopes. They are most effective when used in combination with erosion controls.

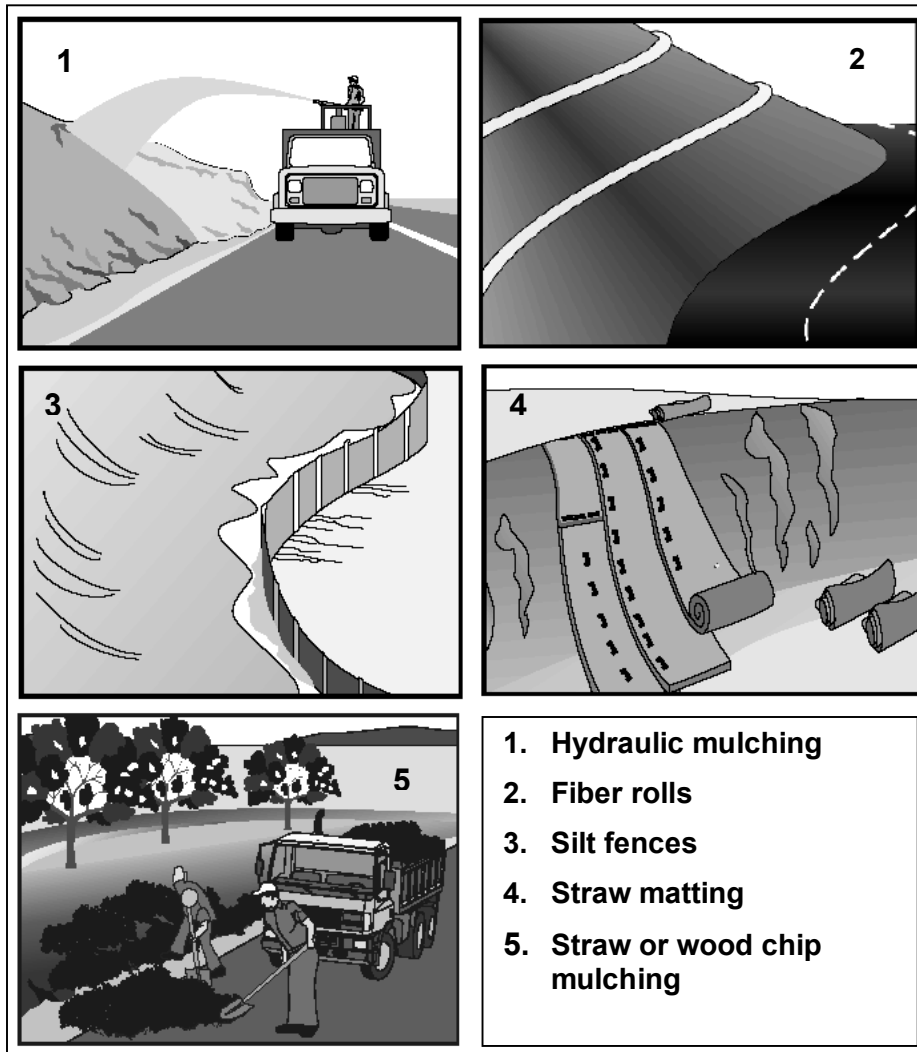


Figure 9 – Examples of Temporary Measures to Protect Your Property

Straw Matting. Straw matting is used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. It can also be used to stabilize soils until vegetation is established. Matting is commonly applied on short steep slopes where erosion hazard is high and vegetation will be slow to establish. This approach is particularly useful when seeding cannot occur (e.g., late season, construction, or the arrival of an early rain season). Matting can be laid on vulnerable slopes and tied down with staples to prevent lifting by wind or water.

Straw or Wood Chip Mulching. Straw or wood chips can be used to hold soil in place. This has the added benefit of increasing the organic content of the soil. Either material should be worked into the top few inches of the soil. A cover layer of chips approximately 2 inches deep (or less) can also be used as slope and soil conditions warrant.

Flood Insurance

Flood insurance under the National Flood Insurance Program is available throughout the unincorporated areas of San Diego County even if your property is not in a flood hazard area. To determine if your property is in a federally designated flood hazard area, you can contact the County of San Diego at (858) 694-2727.

If you have concerns that flooding may cause damage to your home, you should contact your insurance broker regarding flood insurance. Please note that when purchasing insurance voluntarily, there is a 30-day waiting period after the policy is issued, before the coverage becomes effective. For more information about flood insurance, contact the Federal Emergency Management Agency (FEMA) at the following toll free number: 1-800-638-6620.

Glossary of Terms

Bench Drain - Typically a gunite or concrete V-ditch located horizontally and vertically along residential hillside areas. This device assists in draining the slope to protect against hillside erosion. Typical width is 3-5 feet and typical depth is 12". (Same as a "Slope Drain")

Debris - Any combination of soil, rock, mud, trees, or vegetation usually transported by "debris flow".

Debris Flows - Consist of any soil, rocks, boulders, trees, or brush being moved by storm waters and containing sufficient strength to destroy or move objects such as cars and buildings in their path.

Drainage Patterns - The drainage paths storm water runoff usually or historically takes through a given area.

Engineered Concrete Block Walls - Walls engineered to withstand loads caused by water and debris. These walls are considered to be permanent, and do not require yearly replacement.

Flood - (1) A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters; or (2) the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Insurance - Insurance to cover damages to your home, or belongings in your home, caused by flooding, and which can be purchased through your local insurance agent.

Ground Cover - Typically a low-lying plant that will spread outward, eventually covering all surrounding bare soil.

Natural Watercourse - An unimproved natural stream of any size. Includes rivers, creeks, branches, canyons, arroyos, gullies, washes, etc.

Overgrowth - Foliage that has grown and spread out so as to obstruct or block any natural watercourse, improved drainage device, or structure.

Rainy Season - The period of the year from October 15 to April 15 when San Diego County usually receives its largest amount of rain.

Sandbags - A burlap or plastic bag that can be filled with sand or native soil, which can be stacked or placed to redirect storm and debris flows away from homes or property improvements.

Slope Drain - Typically a gunite or concrete V-ditch located horizontally and vertically along residential hillside areas. This device assists in draining the slope to protect against hillside erosion. Typical width is 3-5 feet and typical depth is 12". ("Same as a Bench Drain ")

Sump - A low-lying area with no drainage outlet.

Sump Pump - A pump designed to pump water out of a sump or basement.